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# Local support for renewable energy technologies? Attitudes towards local near-shore wind farms among second home owners and permanent area residents on the Danish coast

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ABSTRACT

This paper documents different attitudes towards local renewable energy technology (RET) projects in Denmark among two key RET stakeholder groups, permanent area residents (PRs) and second home owners (SHOs). It does so via survey data collected from almost 2000 respondents during a Danish near-shore wind farm tender. Judging by this data, local PRs are positive towards the planned local RETs, while SHOs are less so. This emphasizes that potential RET project stakeholders and stakeholder groups may have very different RET project perceptions and opinions. The planned RET projects were subject to widespread critique in the public and political RET project related debate, but the documented PR RET project support was rather silent support. This is a noteworthy inconsistency calling for further research. Drawing upon research insights from the interdisciplinary socially focused energy transitions body of literature, the paper suggests that particular uses of and attachments to particular places may inform stakeholder perceptions of RET related local change. The research findings have significant implications for RET planning, practice and policy more broadly.

## 1. Introduction

Climate change is an increasingly accepted reality, and so is the urgent need for transitions to sustainable energy resources (Rowson, 2013; Whitmarsh, 2011). Accordingly, governments in many countries have prioritized more sustainable modes of energy production and a higher share of renewables in the national energy consumption for quite some time, and the reduction of greenhouse gas emissions has become an international agenda (Karakaya, 2015; UNFCCC, 2015). For example, in 2008 the EU adopted the 20-20 climate and energy package for EU member states, and this implied: 1) 20% reduction in CO2 emissions from the 1990 levels by 2020, 2) 20% energy from renewable energy resources and 3) 20% improvements in energy efficiency (Quartz + co, 2015). In Denmark, the multiple low-carbon and sustainability initiatives comprise ambitions for: 1) 50% of the national electricity consumption produced by wind power in 2020, 2) 35% renewables in the national energy consumption by 2020 and 3) a 100% transition to renewable energy resources by 2050 (Danish Government, 2012; Quartz + co, 2015). In this country, then, wind farm development is crucial for reaching the national sustainability and emissions reduction targets.

### 1.1. Challenging energy transitions: local resistance to renewable energy projects

Specifically, the 2012 Danish Energy Agreement (EA) includes plans for the development of offshore coastal wind farms, referred to as near-shore wind farms (Energi- Forsynings- og Klimaministeriet, 2012).,[1,2] Some of the sites chosen for these planned near-shore wind farm projects are located near coastal communities that host large numbers of summerhouses/vacation residencies, and at some of these sites wind farm opposition was prevalent. The wind farm tender process itself was also characterized by substantial critique from wind farm stakeholders/stakeholder groups, and by unstable levels of political support

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[1] Most of the relevant legislation for the Danish Energy Agreement is found in the Renewable Energy Act (REA) (Energi- Forsynings- og Klimaministeriet, 2018; LBK 119/2018), and the REA (in Danish: Bekendtgørelse af lov om fremme af vedvarende energi) can be retrieved from www.retsinformation.dk. For more information about wind farm planning in Denmark, see (Anker and Jørgensen, 2015; Johansen and Upham, 2019; Miljøministeriet, 2015; Olsen and Anker, 2014).

[2] In the Danish Energy Agency near-shore wind farm tender criteria, a near-shore wind farm is defined as an offshore wind farm minimum 4 km from the coast and maximum 20 km from the coast (Danish Energy Agency, 2013; Havmølleudvalget, 2012).

(Hvelplund et al., 2017). Evidence of near-shore wind farm project support was harder to come by (Johansen, 2018; Johansen and Upham, 2019). This wind farm tender process illustrates that in Denmark, as in many other European countries, the well documented broad public support for wind power (Jysk Analyse, 2015) cannot necessarily be translated into local public support for local wind farm projects (Bell et al., 2005; Johansen, 2017; Megafon, 2015; Olsen and Anker, 2014; Rowson, 2013; Sovacool, 2013). The mysterious 'gap' between popular support for renewable energy technologies (RETs) and levels of support/resistance towards specific planned local RET projects has been subject to overwhelming attention and intense debate in the media, in politics and in research (Burningham et al., 2015; Ellis and Ferraro, 2017; Johansen, 2018; Sebastien, 2017).

### 1.2. Fluid publics and local perceptions of RETs

Multiple factors, such as aesthetics, values, social relations, socio-economic concerns, institutional infrastructures and relationships of power shape the way societies and people interact with technologies (Ellis and Ferraro, 2017; Walker and Cass, 2007), for example wind farms. Accordingly, reactions towards local planned RETs among members of the local publics and other RET project stakeholders will not all be the same, but will be inherently heterogeneous, representing different perceptions of, opinions towards and personal or group stakes in those projects (Brownlee et al., 2015; Johansen, 2018; Walker and Cass, 2007). Reflecting this social complexity, according to Walker and Cass "'the public' is (…) not one thing, but plural and differentiated, produced and demarcated indifferent ways, [and] the imagery of 'liquid social dynamics' [introduced by Sheller in 2004] convey[s] the sense in which publics slip in and out of different contexts, identities and relationships" (Walker and Cass, 2007, pp. 463–464). For RET related planning and development, then, what will be referred to as this complex social substance also constitutes the context for RET project planning and development, and this has implications for the diversity of reactions towards specific planned RET projects. As multiple factors inform perceptions of and attitudes towards RETs among RET project stakeholders/stakeholder groups, it is remarkable how little research attention has been granted the role of differences in attitudes towards RET initiatives previously.

### 1.3. Implications of different perceptions of RETs among project stakeholder groups

This paper contributes with powerful empirical evidence demonstrating at least one important perspective, among many potential perspectives, in this regard. Using survey data from almost 2000 respondents, it does so by focussing on and documenting very different reactions to and attitudes towards local planned RETs (specifically near-shore wind farms in Denmark) among two identified key local RET project stakeholder groups: permanent area residents (PRs) and second home owners (SHOs).[3] As I suggest, what this data robustly shows has widespread implications for RET planning, practice and policy more broadly.[4]

The research draws upon empirical and theoretical insights from the wide-ranging and inherently interdisciplinary socially focused energy transitions body of literature (Sovacool, 2014), and particularly from the significant place attachment body of literature. The paper cautiously suggests that particular uses of, and therefore perhaps particular attachments to, particular places may inform stakeholder perceptions of RETs.

Research is guided by the following research questions:

1. What are the key differences in attitudes towards the planned local near-shore wind farms amongst the project stakeholder groups, PRs and SHOs?
2. What may the observed differences in attitudes towards the planned local near-shore wind farms amongst the project stakeholder groups PRs and SHOs imply vis-à-vis local levels of project opposition or support?
3. What may implications of the observed differences in perceptions of planned local RETs amongst PRs and SHOs be for planning, practice and policy more generally?

The paper is organised in the following way: Section 2 introduces selected background and theory vis-à-vis public perceptions of wind farms, including informative insights from the place attachment body of literature. Section 3 describes the survey method, the sample and the questionnaire. Section 4 presents key survey results and empirical tendencies, and a multiple regression analysis controls for the effects of the different variables on respondent perceptions of the potential near-shore wind farms. Section 5 discusses the wider implications of the survey results for RET related planning, practice and policy, and finally, in section 6 some novel analytical ideas and suggestions for future research are introduced.

## 2. Background and theory

### 2.1. What informs stakeholder perceptions of RETs

Research points towards a "diverse range of political, social, and environmental values (…) that inform stances of [RET] opposition and support" (Burningham et al., 2015, p. 247). Broader issues of energy justice have also been recognized as critical for local perceptions of RETs, and these may include what has been referred to as procedural, recognitional and distributive justice in the RET related project planning and development processes (Rudolph et al., 2018; SLR, 2014). Perhaps most important for local perceptions of/attitudes towards planned local RETs are the local stakeholder anticipations of/predictions of both tangible and more intangible impact of that RET project locally (Ellis and Ferraro, 2017; SLR, 2014; Zaunbrecher and Ziefle, 2015).

In context of wind farm planning and development specifically, the anticipated wind farm project impact on issues such as: local flora and fauna, concrete local benefits (or lack thereof), impact on tourism and property-value etc. frequently preoccupy members of the local publics. Anticipated project impact on more intangible issues are also known to preoccupy people and communities facing RET projects. These may include concerns about for example project impact on personal health and community well-being (Zaunbrecher and Ziefle, 2015, Ellis & Ferrero), and concerns about project impact on the ties between the local publics and specific places/lands of historical, cultural and natural value (Brown and Perkins, 1992; Lewicka, 2011; Massey, 1995; Scannell and Gifford, 2010).

### 2.2. Attachment to place and place protective action

Much literature has found "that place, and related concepts of attachment and identity, play an important role in forming opinions of energy developments" (Brown and Perkins, 1992; Devine-Wright, 2009; Ellis and Ferraro, 2017; van Veelen and Haggett, 2016, p. 2). Place attachment has been aptly described as the "bonding between individuals and their meaningful environments" (Scannell and Gifford, 2010, p. 1),

[3] To date, this large-scale survey is the only one of its type and scope done in Europe.

[4] While much literature mentions local community complexities, it does not necessarily describe these local diversities or discuss their implications for RET planning and development in detail. A notable exception is Brownlee et al. (2015). These researchers investigate the interests of one subpopulation group (marine recreationists) related to offshore wind farm planning, and here I study the differences in levels of wind farm opposition and support amongst two key wind farm stakeholder groups. While such research inquiries only scratch the empirical surface, they do provide a starting point, and may – perhaps - inspire further research.

and place attachment has both physical, cognitive/psychological and social dimensions (Scannell and Gifford, 2010; van Veelen and Haggett, 2016). Place attachment concerns the "variety of meanings and emotions associated with that location by individuals or groups" (Devine-Wright, 2009, p. 427), and attachment to place can be crucial for "collective community level identity, based on shared locality, history and sense of belonging" (Hay, 1998; van Veelen and Haggett, 2016, p. 4). Inspired by and supporting all of these observations, Devine-Wright suggests that local resistance to RETs should be "re-conceived as place-protective actions, which are founded upon processes of place attachment and place identity", (…) as "attempts to prevent forms of change interpreted as disrupting place attachment and threatening place identity" (Devine-Wright, 2009, p. 428,432). In other words, Devine-Wright suggests that local RET opposition may be intimately interlinked with the complex local social dynamics of place attachment and place related identity, and that the result of these phenomena may be place protective action resulting in local RET opposition.

### 2.3. Multiple place attachments and mobile lives

Emergent place-attachment research has demonstrated the importance of attachments to place at multiple scales: People can feel varying degrees of belonging and attachment at different levels, from the neighbourhood/local, to the regional, the national and even to global levels (Devine-Wright, 2013; Devine-Wright and Batel, 2017; Gustafson, 2014; Lewicka, 2011). In what has been described as a globalized, non-sedentary world, highly mobile people may have multiple place-attachments. Moreover, if societies are understood "more in terms of mobility, flows and networks [than in] bounded units such as nation-states and local communities" (Glick Schiller, 2002; Gustafson, 2014, p. 37; Wimmer and Glick Schiller, 2002), this has implications for our attachments to place. So person's/peoples' bonds to place may include attachments to multiple places, perhaps crossing national boundaries, and extending both backwards and forwards in time (Gustafson, 2014; Hay, 1998; Lewicka, 2014; Scannell and Gifford, 2010; Stedman, 2006; Wimmer and Glick Schiller, 2002). People, then, can be attached to multiple places (Gustafson, 2014; Hidalgo and Hernández, 2001).

Places and people are connected, people move, and modern people live in a "highly mobile society." Accordingly, Gustafson suggests in mobile societies of multiple possible place attachments, mobility - or immobility – of individuals "must be associated with qualitative differences in their attachment to place" (Gustafson, 2014, pp. 37–38, 46). So while not all feel at home in the world, in our modern, mobile lives, multiple place-attachments of differing character, strength and depth are likely (Gustafson, 2014; Massey, 1995). Thus, if our lives are lived in multiple places, the qualitative nature, as it were, of the attachments we have to some of those places must also be different. In this paper, people who own a permanent residency and a summerhouse (the SHOs) provide a simple illustrative example of people attached to at least two different places through property ownership/residency.

### 2.4. Differences in attachment to place among PRs and SHOs

Research suggests that residency status, i.e. being a permanent area resident or a second home owner/vacation resident, significantly influences attachment to place and perceptions of local area change. Longer term residents tend to be concerned about longer term issues and the future of their communities, while shorter-term residents tend to be "more focused on short-term desires and priorities" (Stedman, 2006; van Veelen and Haggett, 2016, pp. 5–6). Permanent area residents may also display other values and worries than the vacations residents, the more seasonal visitors, do (Lindén et al., 2015; Pitkänen et al., 2014; Stedman, 2006). For example, studies suggest that SHOs can be opposed to local area development as they are mostly concerned with the environmental qualities, the natural beauty (Farstad and Rye, 2013; Pitkänen et al., 2014) and the importance of their SH local area as an "escape from everyday life" (Stedman, 2006, p. 201). PRs tend to have longer term area priorities and concerns about the needs and necessities of the everyday (van Veelen and Haggett, 2016). One study suggests that plans for local area RETs may represent the hope for a future job amongst some local area residents (Lindén et al., 2015, p. 11). This suggests that for some permanent area residents, RET-related local area change may also comprise expectations of/hopes for a future good and a change for the better locally (Devine-Wright and Howes, 2010; Lindén et al., 2015).


**Fig. 1.** The Danish near-shore wind farm sites selected for the wind farm tender. Source: (Danish Energy Agency, 2013).

## 3. Survey and sample

### 3.1. The data collection process and the sample

The cross-sectional survey data for this study was collected in the autumn of 2015, during the Danish Energy Agency (DEA) multisite near-shore wind farm tender.[5] The simple stratified survey sample was drawn from properties located within relative adjacency to the coast and to the selected DEA near-shore wind farm tender sites, and it was evenly distributed by the five near-shore wind farm sites off mainland Denmark (see Fig. 1). Importantly, the sample included both residents living permanently in those areas (the PRs) and people who owned summerhouses/second homes in those same areas (the SHOs).[6]

All of the people selected for the survey sample received a survey invitation letter at their permanent residency addresses. These letters also included a number of A4 size printed colour wind farm visualizations from the official and publicly available near-shore wind farm EIA material, and those visualizations illustrated realistic 3 MW and 10 MW

[5] For more information on this Danish near-shore wind farm tender, see (Danish Energy Agency, 2013, 2017).

[6] Approximately 40% of the full sample respondents lived/owned properties within 500 m from the coast, about 40% from 500 m to 2000 m from the coast, while only less than 20% of the sample respondents lived in/owned properties more than 2000 m from the coast (Johansen and Emborg, 2018).

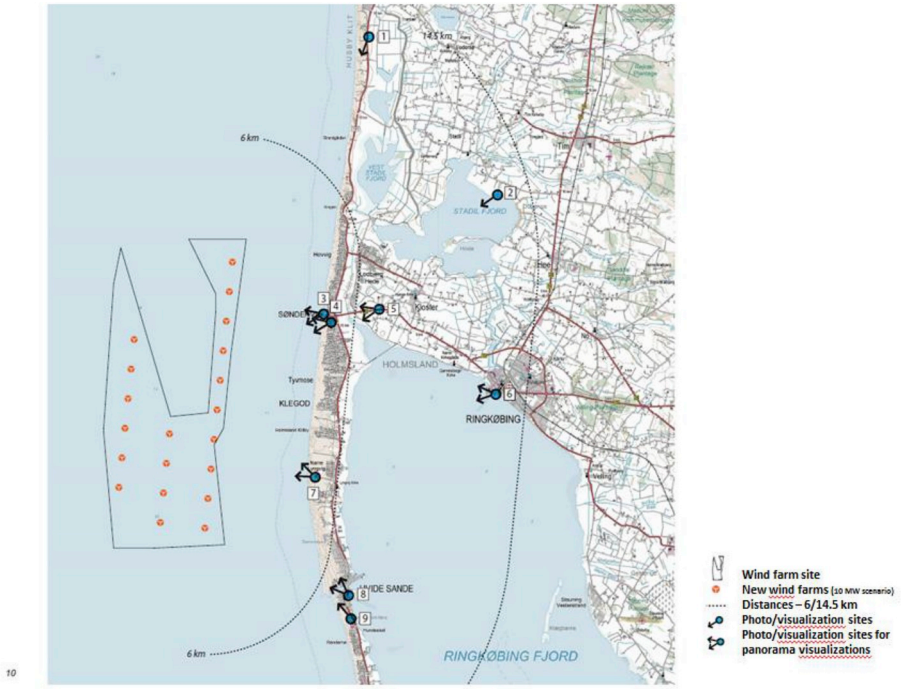


**Fig. 2.** Map of the Vesterhav Syd near-shore wind farm site from the Environmental Impact Assessment (EIA) visualization material (source Energinet.dk, NIRAS and URLAND, 2015).


**Fig. 3.** Example of a project visualization from the EIA visualization material. Translation of the original figure caption: Visualization site 9: South of Hvide Sande. Visualization showing 66 3 MW wind turbines (137 meters in total height). Distance to the nearest turbine approximately 7.7 km. Note: only 55 of the 66 turbines are visible in this photo section. (Source: Energinet.dk, NIRAS and URLAND, 2015).


**Fig. 4.** Example of a project visualization from the EIA visualization material. Translation of the original figure caption: Left side of the panorama. (Visualization site 3: The beach by Søndervig – Visualization that shows 20 10 MW turbines (220 meters in total height). Note: only 14 of the 20 turbines in total are visible within this double photo section. Distance to the nearest turbine approximately 4.6 km. (Source: Energinet.dk, NIRAS and URLAND, 2015).

wind farm project scenarios as developed in the project EIAs (Danish Energy Agency, 2017). The enclosed visualizations showed the planned wind farm projects at the specific wind farm project site close to where people selected for the survey sample lived, so potential survey respondents could (possibly) recognise particular views and/or landscape features from their local neighbourhood in the wind farm visualizations. In the survey invitation letter people were encouraged to "look carefully at the wind farm visualisations" before responding to the survey. The Danish Data Protection Agency (Datatilsynet) approved the survey design and the survey content (see Figs. 2–4).

Response-rates from the five selected geographical areas close to the DEA selected near-shore wind farm sites varied little compared to the sample distribution, and the final survey response rate was almost 2000. The effective survey sample (N = 1913) consists of 59.0% PRs (n = 1129), 35.3% SHOs (n = 676), and the small group with status as PRs and SHOs in the same municipality (n = 108, 5.6%) is coded missing in the subsequent analysis. The sample consists of 69.4% males (n = 1327), 30.6% females (n = 586),[7] and the sample mean age is 60 (SD = 12). As a group SHOs have relatively high levels of education,

[7] The survey invitation letters were sent to the main registered property owners. As we discovered, however, in Denmark the main registered property owners are still predominantly male, so this resulted in more male survey respondents than female respondents.

**Box 1**
On residency status and taxation.

The official status of SHOs and PRs in Denmark.

In Denmark PRs differ markedly from SHOs vis-à-vis taxation status and the legal use of properties. For example, citizens cannot legally reside in properties registered as summerhouses/second homes permanently unless certain special conditions apply, and persons can only register one permanent residency address. This address, then, serves as the legal basis for income taxation (see borger. dk; skat. dk).

income and age seniority.[8] 66% of the sample SHOs estimate that they spend 2 months or less annually in their second home, and only 14.2% of the SHOs chose "mostly an investment" as the reason for owning that second home. Hence the sample SHOs are first and foremost what has previously been described as area vacation residents or seasonal visitors (see Pitkänen et al., 2014) (see Box 1).[9]

### 3.2. Questionnaire

Many survey questions were answered on a Likert type scale with five level Likert item options. If appropriate, the choice of the Likert item "I don't know" or similar was an option too. The key questions concerned respondent attitudes towards the planned local RETs. Moreover, a large survey section focused on the personal use of, perceptions and perceived importance of the local area; respondents were asked to estimate how often they visited the coast and how much local area responsibility they felt. Finally, respondents were asked to anticipate what degree of impact the potential local wind farms would have on specific themes, i.e. the local coastal landscape, noise levels, fauna, local jobs, local economy, tourism and their personal use of nature locally.

## 4. Results

### 4.1. Wind farm acceptance levels among PRs and SHOs

The following sections show key data that illustrates the levels of planned local wind farm support and opposition as indicated by the survey respondents. Firstly, the effect of selected demographic variables on levels of wind farm acceptance are shown, and then the surprisingly substantial differences in attitudes towards the planned local RETs among the key stakeholder groups PRs and SHOs are demonstrated in different ways (4.1–4.3). Finally, a stepwise binomial regression analysis controls for the effect of selected variables on indicated attitudes towards the planned local wind farms among PRs and SHOs respectively (4.4).

In the key question: "What is your attitude towards the planned near-shore wind farms close to your local area?" (Q11) respondents had the choice of five Likert items ranging from "very negative" to "very positive".[10] Judging by chi-squared tests, there is no statistically significant correlation between gender ($p = 0.838$, $p > 0.1$) and age ($p = 0.426$, $p > 0.1$) for reported levels of wind farm acceptance among the respondents, but levels of self-reported income do emerge as important for levels of planned local wind farm acceptance ($p < 0.01$***). Interestingly, in the full sample (i.e. in the sample of SHOs and PRs combined) respondents are moderately more positive (46%) than negative (38%) towards the planned near-shore wind farms. In this question 16% of the full sample choose the option "neutral."

What is even more surprising is that PRs are very positive towards the planned near-shore wind farms overall. Indeed, in the statistically significant two-way table that shows PR and SHO reported attitudes towards these planned local RET projects (see Fig. 5), 56% of PRs in the sample report a positive attitude towards the planned local near-shore wind farms, while only 29% of the sample PRs report negative attitudes towards the planned near-shore wind farms. Among the SHOs, on the other hand, only 29% of the sample report positive attitudes towards the planned near-shore wind farms, while 53% of the sample report negative attitudes towards the planned near-shore wind farms. Interestingly, then, the level of near-shore wind farm acceptance amongst the key stakeholder groups PRs and SHOs is practically inverted, with the PRs (the permanent area residents) welcoming the planned local wind farms. Treated as a group, then, SHOs are very *negative* towards the planned local near-shore wind farm projects, while PRs are much more *positive* towards those same planned local RETs. This is powerful empirical evidence that shows the presence of local majority RET project support amongst the permanent area residents. As I suggest in the discussion, this local majority project support was also silent majority project support.

In the survey respondents also indicate what they anticipated the impact of the planned local near-shore wind farms would be on specific local area themes: the coastal landscape, noise levels, marine life, fauna, local jobs, local economy, tourism and finally their personal 'use' of the local area. Respondents did this on a five level Likert scale with Likert items ranging from "very negative" (1) to "very positive" (5). To determine differences in anticipated local wind-farm impact levels amongst PRs and SHOs respectively, an independent samples *t*-test was run for all of these grid questions.

### 4.2. Anticipated wind farm impact on local area themes among PRs and SHOS

Concerning anticipated wind farm impact on the local, coastal landscape, for example, PRs are more positive (2.52 +-1.12) than SHOs (1.95 +-0.97) with a statistically significant difference of 0.57 (95% CI, 0.47–0.67) more positive wind farm project impact/acceptance score (see Table 1). Interestingly, both groups of stakeholders predict that the potential near-shore projects have positive effects on the creation of local jobs and on the local economy. Regarding anticipated wind farm project impact on the local economy, PRs are more positive (3.68 +-0.85) than SHOs (3.32 +-0.91) with a statistically significant difference of 0.36 (95% CI, 0.26–0.45) in mean anticipated project impact/acceptance score.

All tests prove statistically significant ($p < 0.001$), and all tests also underscore that PRs are more positive (or less negative) than SHOs regarding the predicted impact of the near-shore wind farm projects locally.

### 4.3. The importance of use of the coast for levels of wind farm acceptance among PRs and SHOs

The statistically significant two-way tables in Fig. 6 show how many visits to the coast the respondents estimate they make during the summer on a daily/weekly basis (i.e. active use of the local coastal

[8] As owning a second home requires some level of economic liquidity this tendency may be expected. 197 respondents in the sample did not inform age, 219 respondents did not include information on income and 54 picked the option "other" for education. For more detailed information on the demographics in the survey sample, see (Johansen and Emborg, 2018).

[9] As I cautiously suggest later, perhaps this more temporary and intermittent 'use' of the local area may in part inform the specific ontological nature, as it were, of attachments to that local area amongst SHOs (see section 6).

[10] In this paper I often use the wording local wind farm acceptance levels, or similar. This, then, refers to the documented Likert scale average amongst the relevant respondent groups for Q11.

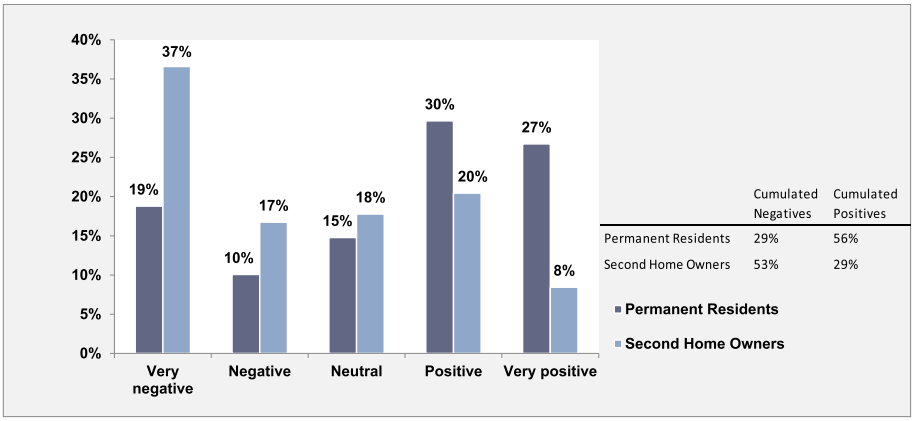


**Fig. 5.** Attitude towards the planned near-shore wind farms among PRs and SHOs. Scale: very negative to very positive. Note: n = 1798, p < 0.001***.

**Table 1**
Anticipated impact of near-shore wind farms on different local area themes, mean values.

| | PRs | SHOs | Mean difference | 95% Confidence Interval | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| Costal landscape | 2.517 | 1.947 | 0.570*** | 0.469 | 0.670 |
| Noise levels | 2.642 | 2.293 | 0.570*** | 0.263 | 0.436 |
| Marine life, i.e. fish | 2.877 | 2.614 | 0.350*** | 0.264 | 0.435 |
| Flora & fauna, i.e. birds | 2.639 | 2.320 | 0.350*** | 0.160 | 0.365 |
| Local jobs | 3.779 | 3.420 | 0.263*** | 0.167 | 0.359 |
| Local economy | 3.679 | 3.325 | 0.263*** | 0.226 | 0.411 |
| Local tourism | 2.668 | 2.127 | 0.318*** | 0.229 | 0.408 |
| My use of local area | 2.870 | 2.375 | 0.318*** | 0.404 | 0.586 |

Note: ***p < 0.001***, p < 0.05**, p < 0.01* Coding: From very negative (1) to very positive (5).

landscape) by indicated wind farm acceptance levels. Overall, these graphs illustrate that more active and frequent use of/visits to coast correlate with more negative attitudes towards the planned wind farms. In other words, the more respondents 'use'/visit the local coastal landscape, the more likely they are to be more negative towards the planned local near-shore wind farms. While this is true for both SHOs and PRs, the tendency is stronger among the sample SHOs.

Interestingly, the table also clearly shows that the SHOs 'use' the local coastal landscape more frequently than the PRs do. This suggests that, compared to the permanent area residents, SHOs prioritise such outdoor activities more when they spend time in their local SHO area. This documented difference in numbers of visits to the local coastal landscape among PRs and SHOs respectively may well be a simple and logical consequence of SHOs being area vacation residents (in the literal sense of the term), i.e. SHOs mostly spend time in their second home/vacation residency when on holidays. However, this prioritization may also suggest more general differences in the 'types' of - or the ontological nature of - the attachments to precisely the local coastal landscapes amongst the two stakeholder groups.

### 4.4. Regression analysis

A four-step binomial logistic regression assesses the effects of the predictor variables on the dependent variable: the indicated attitude towards the potential local near-shore wind farms[11] (see Table 2). Using the stepwise regression facilitates the identification of independent variables important for the dependent variable, and in all models tolerance values greater than O.1 show no evidence of multicollinearity.

Model 1 and 2 includes the full sample: In model 1, predictors are the demographic variables: age, level of education, self-reported household income and residency type. Model 2 adds questions concerning engagement in and attachment to the local area. Adding the estimated number of visits to the coast during summer, Model 3a and Model 3b splits the sample into groups of PRs and SHOs respectively, and these models also study anticipated effects of local wind farm impact on different themes among the two stakeholder groups. Judging by $\chi 2$-tests all four models prove statistically significant at $p < 0.001$.

In model 1, a value of 0.092 Nagelkerke R2 indicates 9.2% explained model variance. In this model, with the chosen reference category high school or similar as highest level of completed education, respondents with longer, higher education emerge as a statistically significant ($p < 0.05$) very negative group (odds 1.72). With low-income households as reference category, as self-reported household income levels increase so do negative perceptions of the potential near-shore windfarms: Medium-income house-holds ($p < 0.05$, odds = 1.421) and high-income households ($p < 0.05$, odds = 1.680) have increasingly higher odds of being negative towards the potential nearshore wind farms. All other things being equal, among selected predictor variables in model 1 SHOs ($p < 0.001$, odds = 2.41) have the highest odds of being negative towards the potential near-shore windfarms. Adding the predictor variables sense of local area responsibility and importance of experiencing local area nature and landscape, in Model 2 the Nagelkerke R2 value suggests explained model variance of 20.1%. In this model, only the demographic variables household income categories and residency type ($p < 0.001$, odds = 2.32) remain statistically significant factors. Aside from gender and age, all have higher odds of being negative towards the potential nearshore wind farms. Indicated importance of visiting the local area, nature and landscape emerge as a statistically significant predictors ($p < 0.001$, odds = 2.27) correlating with negative wind-farm perceptions, and the sense of local area responsibility emerges as a statistically significant variable too ($p < 0.001$). A stronger indicated sense of local area responsibility suggests very negative potential local wind-farm perceptions (odds = 1.8). Models 3a and 3b explore differences in attitudes towards the potential near-shore wind farms among PRs (3a) and SHOs (3b) when controlled for selected predictor variables. The variables anticipated wind-farm impact on the local coastal landscape, noise, flora and fauna, jobs and local economy, tourism, and finally personal 'use' of the local area, are added to the model. In model 3a, featuring PRs, a value of 0.839 Nagelkerke R2 indicates 83.9% explained model variance. This model correctly classifies 93.9% of the cases. In model 3b, with a sample of only SHOs, the value of 0.849 Nagelkerke R2 indicates 84.9% explained model variance. Model 3b correctly classifies

[11] Dependent variable dummy coding: 0 = neutral, positive and very positive. 1 = negative and very negative.

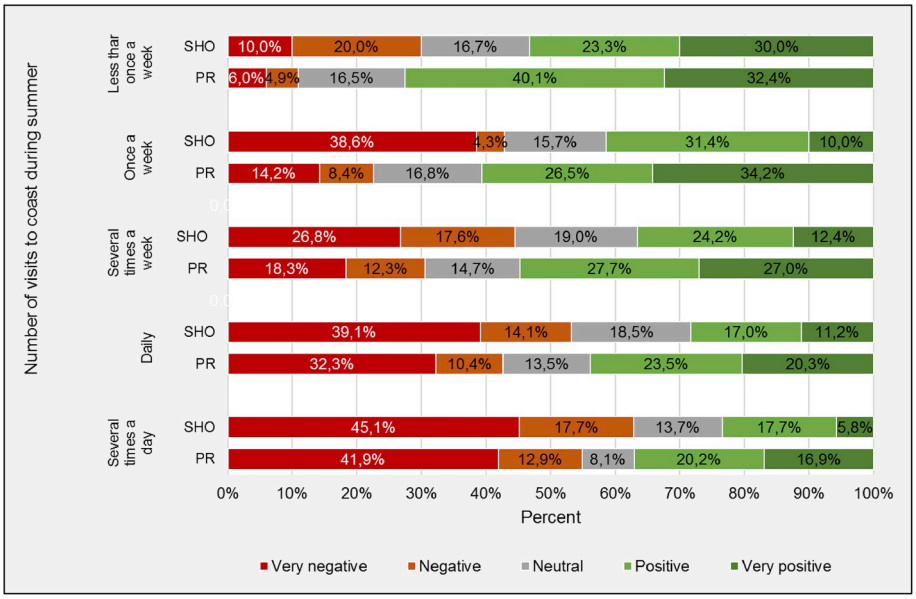


**Fig. 6.** Number of visits to the coast during summer for permanent area residents (PRs) and second home owners (SHOs) by wind farm acceptance levels (from very negative to very positive). Note: n = 1783. n PRs, 1128, $p < 0.001$*** n SHOs, 655, $p = 0.001$***.

92% of the cases.

Among SHOs (model 3b) medium length ($p < 0.025$) and higher levels of education ($p < 0.01$) remain statistically significant. SHOs with the highest levels of household income appear as are a statistically significant ($p < 0.1$) very negative group concerning perceptions of the potential near-shore windfarms (SHO high income, odds = 4.70) wind farms. A possible explanation for this tendency can be respondent worries about declining summerhouse prices due to the potential local near-shore wind farms. Interestingly, PRs with medium level household income emerge as a statistically significant ($p < 0.05$) group with positive perceptions of the potential wind farm projects. This tendency could be due to PR hopes for a RET-related job (Lindén et al., 2015). For both SHOs and PRs, anticipated impact of windfarms on selected themes locally is statistically significant. For SHOs, anticipated effect on the local coastal landscape ($p < 0.001$), fauna, i.e. birds ($p < 0.05$), effect on local tourism ($p = 0.001$) and personal 'use' of the local area ($p < 0.001$) all emerge as statistically significant. All other things being equal, For PRs anticipated impact on the coastal landscape, tourism and use of local area are statistically significant ($p < 0.001$) variables too. In all cases odds significantly > 1 show that anticipated negative wind-farm impact on different themes locally indicate more negative perceptions of the potential near-shore windfarms. For both PRs and SHOs results for the variables anticipated impact on the local coastal landscape and personal 'use' of the local landscape soar to odds > 6 of being negative towards the potential local nearshore wind farms.

Interestingly, expected wind-farm impact of noise is not a statistically significant factor for both groups, and among PRs, anticipated windfarm impact on local fauna, i.e. birds, is not statistically significant. Especially debate about wind farm project related impact on birds has received considerable public and political attention during the tender (Ellis and Ferraro, 2017). Among SHOs a higher sense of local area responsibility emerges as a statistically significant factor ($p < 0.05$) correlating with much higher odds (odds = 2.74) of negative local wind-farm perceptions. This can be interpreted as evidence that SHOs practice place protective action (Devine-Wright, 2009) based on wishes for their SH local area to stay just as it is (Stedman, 2006). In sum, models 3a and 3b reveal differences in responses towards the project-plans among the two stakeholder groups PRs and SHOs, and the hierarchical regression model demonstrates that SHOs are more negative towards the potential local near-shore wind farms than PRs are.

## 5. Discussion

Leaning on related research and elaborating upon the research findings, the discussion focusses on themes of general interest for RET planning and development and for energy transition studies. More specifically, the most substantial empirical research contributions are highlighted (5.1–5.3), research implications for RET related policy and practice are discussed (6.1–6.2), and finally, drawing from and building upon the presented data, novel observations, arguments and embryonic analytical ideas are presented (6.3–6.4).

### *5.1. Empirical contribution of the research*

#### *5.1.1. Differences in levels of wind farm acceptance among PRs and SHOs*

This paper presents large-scale survey data on local perceptions of/attitudes towards planned near-shore wind farms in Denmark, and the survey sample comprises both local area SHOs and PRs. The empirical survey evidence aptly illustrates significant differences in PR and SHO perceptions of the planned local near-shore wind farms: permanent area residents are more positive towards the plans for local area RET-related change than SHOs are (see Figs. 5 and 6 and Table 1). What this data shows, then, is the presence of permanent area resident local majority support for the planned wind farms.

#### *5.1.2. The complex local substance and a diversity of project stakeholder groups*

In energy transition studies with a more social focus, the implications of such potentially disparate RET project stakeholder groups for RET related planning, practise and policy have received minimal research attention previously, but there are multiple reasons as to why the wider RET project stakeholder communities deserve research and policy attention (Brugha, 2000).

Firstly, the specific project practicalities and the wider governance framework constitute the context for RET project development. This local social and governance project context has implications for the way in which the project will be perceived and responded to locally. For example, this research clearly shows that different RET project stakeholder groups may have very different perceptions of planned RET projects.

The data presented here does not comprehensively map local community complexities within relative proximity of the planned near-

**Table 2**
Logistic regression. Attitudes towards the potential local near-shore wind farms.

| | Model 1 - Demographics (Full Sample) | | | Model 2 (Full Sample) | | | Model 3 (Permanent Residents) | | | Model 4 (Second House Owners) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Logit Coefficient | Standard Error | Odds Ratio | Logit Coefficient | Standard Error | Odds Ratio | Logit Coefficient | Standard Error | Odds Ratio | Logit Coefficient | Standard Error | Odds Ratio |
| Constant | −1.82*** | 0.34 | 0.16 | −7.65*** | 0.70 | 0.00 | −22.96 *** | 2.65 | 0.00 | 4.06*** | 3.61 | 0.00 |
| **Demographics** | | | | | | | | | | | | |
| Gender (M = 0, F = 1) | 0.06 | 0.13 | 1.06 | −0.11 | 0.14 | 0.89 | −0.41 | 0.49 | 0.66 | −0.07 | 0.55 | 0.93 |
| Age (reference category: 20–39 years) | | | | | | | | | | | | |
| 40–59 years | 0.14 | 0.25 | 1.15 | −0.04 | 0.27 | 0.96 | −0.18 | 0.69 | 0.83 | −0.32 | 1.52 | 0.73 |
| 60 years and above | 0.31 | 0.26 | 1.37 | 0.00 | 0.27 | 1.00 | 0.29 | 0.67 | 1.34 | −0.48 | 1.56 | 0.62 |
| Education (reference category: Primary to Highschool Education) | | | | | | | | | | | | |
| Vocational training | 0.22 | 0.23 | 1.25 | 0.13 | 0.24 | 1.14 | 0.55 | 0.69 | 1.74 | −1.22 | 0.87 | 0.30 |
| Short to Medium Length Higher Education | 0.34 | 0.23 | 1.41 | 0.16 | 0.24 | 1.17 | 0.51 | 0.74 | 1.67 | −2.71*** | 1.01 | 0.07 |
| Long Higher Education | 0.54** | 0.25 | 1.72 | 0.34 | 0.27 | 1.41 | 0.55 | 0.71 | 1.72 | −2.02** | 0.90 | 0.13 |
| Income (reference category: Below 299.000 DKK) | | | | | | | | | | | | |
| 300.000–699.999 DKK | 0.35*** | 0.18 | 1.42 | 0.36 ** | 0.18 | 1.44 | −1.07 ** | 0.51 | 0.34 | 1.28 | 0.82 | 3.59 |
| 700.000 DKK and above | 0.52** | 0.20 | 1.68 | 0.40 * | 0.21 | 1.49 | −0.44 | 0.58 | 0.65 | 1.55* | 0.87 | 4.70 |
| Residency type (PRs = O, SHOs = 1) | 0.88*** | 0.12 | 2.41 | 0.84 *** | 0.13 | 2.32 | x | x | x | x | x | x |
| **Place related variables** | | | | | | | | | | | | |
| Importance of experiencing nature and the landscape | | | | 0.82 *** | 0.12 | 2.27 | 0.37 | 0.34 | 1.45 | −0.22 | 0.41 | 0.81 |
| Sense of responsibility towards the local area | | | | 0.59 *** | 0.10 | 1.80 | 0.04 | 0.26 | 1.04 | 1.01** | 0.41 | 2.74 |
| **Anticipated windfarm impact on local area themes** | | | | | | | | | | | | |
| Coastal landscape (scale: Very positive to very negative) | | | | | | | 1.98 *** | 0.32 | 7.21 | 1.87*** | 0.39 | 6.46 |
| Noise levels | | | | | | | −0.07 | 0.27 | 0.93 | 0.11 | 0.37 | 1.12 |
| Flora & fauna, i.e. birds | | | | | | | 0.27 | 0.27 | 1.30 | 0.89** | 0.38 | 2.43 |
| Local jobs | | | | | | | 0.07 | 0.36 | 1.07 | 0.52 | 0.53 | 1.67 |
| Local economy | | | | | | | 0.53 | 0.35 | 1.69 | 0.17 | 0.49 | 1.18 |
| Local tourism | | | | | | | 0.94 *** | 0.25 | 2.55 | 1.14*** | 0.33 | 3.14 |
| Use of local area | | | | | | | 1.96 *** | 0.36 | 7.11 | 2.05*** | 0.48 | 7.80 |
| Number of visits to the coast during summer | | | | | | | 0.08 | 0.15 | 1.09 | −0.08 | 0.23 | 0.92 |
| **Model Summary** | | | | | | | | | | | | |
| Model $\chi^2$ | | | 100,379*** | | | 228.96*** | | | 617.84 | | | 398.61 |
| df | | | 9 | | | 11 | | | 18 | | | 18 |
| Pseudo $R^2$ (Nagelkirke) | | | 0.09 | | | 0.20 | | | 0.84 | | | 0.849 |
| Model prediction success | | | 63.30 | | | 69.10 | | | 93.90 | | | 92 |
| n = | | | 1479 | | | 1469 | | | 686 | | | 436 |

***Significant at the 0.01 level, **significant at the 0.05 level, *significant at the 0.1 level.
Dependent variable: Attitudes towards the potential local near-shore wind farms. Coding: very positive, positive and neutral, 0. Negative and very negative, 1.
**Scaling.**
Importance of experiencing nature and the landscape: from 1, not at all important to 5, very important.
Indicated sence of local area responsibility: from 1, I strongly disagree to 5, I strongly agree.
Anticipated wind farm impact on local area themes: from 1, very positive to 5, very negative.
Number of visits to the coast during the summer: from few to more.

shore wind farm sites, but it does prove a powerful point. By illustrating such variance in project perceptions amongst just two potential RET project stakeholder groups, the data indicates how real those local social complexities must be amongst the multiple potential RET project stakeholders and diverse project interest groups. In this way, the presented research data has exposed fragments of the local and wider social complexities that have serious repercussions for energy transitions planning, practice, policy and politics overall.

#### 5.1.3. The silent majority

Secondly, and crucially, judging by the research data, evidence suggests that a silent and positive local majority (Bell et al., 2005; Bell et al., 2013) living within relative proximity of the selected near-shore wind farm sites supported the planned RET projects. The active locally based project opposition groups, then, represented a local negative minority (Johansen and Upham, 2019; see also Bell et al., 2005).

As evidenced substantially elsewhere, in the 2015–2016 Danish Energy Agency near-shore wind farm tender, it was the wind farm opposition: the RET project opposition initiative groups and the political critique that received most of the attention in the media and in the political debates (Hvelplund et al., 2017; Johansen and Upham, 2019). This concentration of negative public/media attention indicates a local community and media imbalance in the Danish near-shore wind farm tender focus, an imbalance that resulted in the emphasis of the wind farm project opposition rather than on the wind farm project support.

What this implies, then, is that sometimes the public, political and the media debates concerning specific RET projects may not necessarily be fully representative of e.g. 'local' attitudes towards/perceptions of those RET projects. Moreover, perhaps sometimes the attention granted to (or taken by) certain local RET stakeholders may result in the representation of local realities that is somehow skewed. While in related research much attention has been paid to wind farm (or other RET related) project resistance, much less focus has been granted the levels and the nature of local wind farm support. In this case too, questions as to why this documented level of local wind farm support; of why this local positive majority (Bell et al., 2005) quietly revealing its presence in the dataset remained so strangely silent are pending.

## 6. Conclusion and policy implications

### 6.1. The voice of the silent majority

To the extent that the empirical evidence presented here, i.e. evidence of a local positive and silent majority that supports local planned RET projects, is exemplary of RET related tendencies of support and opposition in other local RET project contexts too, the question is what the wider implications are for RET planning and policy.

In the context of RET planning and development, a practical recommendation could be for planners, policy-makers and politicians to thoroughly research the nature of public/local opinions of and attitudes towards local planned projects (RETs or others); to document local levels of planned project opposition and/or support. Here, one approach could be to use local representative surveys or opinions polls (i.e. similar to this study) (see also Bell et al., 2005), and ideally these should be supplemented with more qualitative research approaches too. For all stakeholders involved, and particularly for planners, policy makers and politicians, such research and data could also function as a 'reality check' and – perhaps - as a supportive tool when dealing with the diverse local publics, with the press and with local groups voicing their diverse opinions about the projects. For some, such data may serve as a friendly reminder that their voice is not necessarily the only voice in the local communities, asother people and local citizens may just have chosen a more passive voice. Perhaps a voice of more silent consent. Overall, the notion of the silent majority touches upon the fundamental democratic challenges and questions of representation; of socio-demographic and socio-economic underpinnings of power and (in) equality, and of whose voice is heard where for what reasons.

### 6.2. Who are the RET project stakeholders? Implications for RET related CBSs

Thirdly, the complex local social substance, and the potentially very diverse landscape of wider project stakeholder groups, has implications for any RET related practice and policy - including RET related incentive schemes and/or compensation schemes.

Particularly in the context of wind farm planning and development, these are widespread. Spurred on by the persistent local resistance to wind farms throughout Europe, in many European countries governments have designed and implemented different types of wind farm related policy initiatives encouraging more local support of and engagement in new local wind farm projects (Anker and Jørgensen, 2015; Kerr et al., 2017). In Denmark, too, extensive wind farm related policy initiatives and community benefit schemes (CBSs) have been implemented, notably the wind farm co-ownership scheme (WCS) that targets potential wind farm 'neighbors'/local area residents (Anker and Jørgensen, 2015; Johansen and Emborg, 2018).

Research shows that the potential beneficial effects of such policy initiatives/CBSs are inherently dependent on that local social context and on the wider project stakeholder landscape (Cass et al., 2010; Ellis and Ferraro, 2017; Johansen and Emborg, 2018). For example, some demographic variables and certain personal values amongst potential CBS beneficiaries prove crucial for the general appeal and reach of those schemes. Consequently, if such initiatives are not well adapted to reach their specified target groups, their beneficial effects may be reduced (Johansen and Emborg, 2018; Kerr et al., 2017), and as empirical data in this paper underscores, potential CBS target groups within that complex local social substance may indeed be diverse.

In Denmark, the WCS originally targeted only permanent area residents and local wind farms 'neighbors.' During near-shore wind farm tender, however, this wind farm policy initiative was expanded so that, given certain criteria, SHOs who owned summerhouses located within relative proximity of certain off-shore wind farm project sites (including the DEA near-shore wind farm tender sites) qualified for the WCS too (Energi- Forsynings- og Klimaministeriet, 2018; LBK 119/2018). There are different ways to view this policy adjustment: On the one hand, for a stakeholder group that has proven negative towards the planned near-shore wind farms, the potential mediatory and compensatory effects of the WCS may prove beneficial, perhaps minimizing wind farm project resistance. On the other hand, granting wind farm shares to seasonal/non-permanent residents (SHOs) challenges the original WCS ideas and ideals of wind farm co-ownership for wind farm 'neighbors,' and the PRs are the people facing the planned RETs on a permanent basis.

While the potential (beneficial) effects of this particular CBS adjustment will be challenging to document going forward, questions of what 'qualifies' any project stakeholders as potential CBS beneficiaries is fundamental, and something that planners and policy makers will continue to struggle with. Crucially, if RET related CBS policy design (perhaps inadvertently) does not effectively reach the appropriate CBS target groups, feelings of distributional and recognitional injustice (National Economic and Social Council Ireland & SLR Consulting, 2014; Sovacool, 2013) may be provoked amongst members of the local publics most effected by the planned RETs. The key message being that demographics, inherent community complexities and project stakeholder values matter for the potential effect and impact of incentive schemes.

While the chosen case study here focusses on wind farm planning specifically, the main takeaways presented in the discussion are broadly applicable for energy transitions studies with a more social focus, and thus also for the significant body of energy transitions literature. The next section discusses the research limitations, and via these possible future research themes and issues.

### 6.3. Analytical implications and suggestions for further research

#### 6.3.1. Multiple attachments to place and reactions to RET related change

The core data from this empirical study shows that PRs and SHOs have very different perceptions of potential local RET related change. Moreover, research on SHOs emphasizes that summerhouses and permanent area residencies serve very different purposes for their owners (see section 2.3 and 2.4), and that PRs and SHOs appreciate very different things in and of those same local areas (Lindén et al., 2015; Stedman, 2006) (see also section 4.3).

Place attachment research also suggests that in mobile lives of multiple place-attachments, time(s) spent at different places important to us shape our attachments to those particular places (Brown and Perkins, 1992; Devine-Wright, 2009; Gustafson, 2014). Moreover, different places may be important to us for diverse social, cultural, emotional reasons or practical purposes (Hay, 1998; Massey, 1995; Scannell and Gifford, 2010), e.g. the place being a home base in the hustle and bustle of the everyday, or a holiday oasis of peace and quiet.

Seen in this light, the hypothesis that particular uses of and therefore perhaps particular attachments to particular places may inform stakeholder perceptions of RETs seems plausible. This, again, suggests that the differences in reactions towards potential local RET related change amongst diverse stakeholders, here PRs and SHOs, is (in part) informed by differences in the ontological nature, as it were, of specific attachments to those same local places (see section 1.3).

Via the case study of SHOs and PRs presented here, the main arguments supporting this hypothesis can be summarized as follows: 1) SHOs and PRs 'use' the same local areas for different purposes. 2) Related research has documented differences in attachments to and expectations from the same local places amongst SHOs and PRs, and 3) SHOs and PRs may have very different reasons for local RET project opposition or support. In order to explore and perhaps substantiate this hypothesis fully, however, more focussed qualitative and in-depth research is required.

#### 6.3.2. RET project adaptation: the case for longitudinal and qualitative studies

Much informative research has documented local perceptions of RETs at a single point in time, mostly focussing on the project resistance, but members of the local publics do adapt to the RET related change of place. Yet, these diachronic dimensions of RET project coping/adaptation by members of the effected publics over time has received only little research attention previously. In order understand what has been referred to as the multiple psychological phases of response to change of place over time; stages of living through, coping with and adapting to change of place (perhaps caused by RETs) (Brown and Perkins, 1992; Devine-Wright, 2009, 2014; Gustafson, 2014), longitudinal research (qualitative and/or quantitative) is required.[12] Moreover, qualitative research approaches would constructively supplement quantitative data (Upham et al., 2019), here enabling more in-depth understandings of what lies beneath the documented project stakeholder reactions to RET-related change, perhaps unveiling components of the cognitive processes that do shape project related support, resistance and/or anger among RET project stakeholders. For multiple perspectives of RET related planning, practice and policy, such insights could prove beneficial.

[12] These psychological stages have previously referred to as place-disruption, adaptation, sense-making, coping and acceptance (Brown and Perkins, 1992; Devine-Wright, 2014; Gustafson, 2014). The Danish near-shore wind farm projects could provide an ideal case study. Combining the existing survey-data with follow-up studies from both the project construction/development phases (planned for 2020) and the post-project completion phases would effectively explore and document the synchronic stages of people/peoples living through RET-related disruption to place.

## 7. Conclusion

This research has explored local perceptions of planned local RETs amongst two key RET stakeholder groups (PRs and SHOs), and it has done so using survey data collected during the Danish 2015–2016 near-shore wind farm bid for tender. The data was collected from citizens potentially facing the planned local RETs.

The presented research has multiple implications for RET related planning, practice, policy and research. Firstly, empirical evidence emphasizes that the complex social substance may comprise multiple RET project stakeholders/stakeholder groups with diverse project perceptions and opinions. Here, for example, data documents significant differences in perceptions of/attitudes towards the planned local RETs among PRs and SHOs. Secondly, the data shows that a majority of the local permanent area residents supported the locally planned RETs, and yet their voices of support were all but silent in the wider RET project related public and political debate (Bell et al., 2005; Johansen and Upham, 2019). In this light, documenting levels of local project opposition/support could prove a beneficial tool and 'reality check' for all RET project stakeholders involved. Research into the social dynamics of the wider RET project stakeholder communities - including the nature of and the levels of RET project opposition and support - is called for. Thirdly, the importance of the complex social substance for RET related practice and policy is emphasized. For example, certain personal values and demographic variables inform how potential CBS beneficiaries and RET stakeholder groups perceive the RET related CBSs, and the question of who 'qualifies' as CBS beneficiaries linger. Finally, based on the presented data and related research it seems plausible that nature or types of attachments to those same local places among PRs and SHOs respectively may, in part, explain the documented differences in reactions to potential RET related local change among the two stakeholder groups. Further research is needed to substantiate this hypothesis, however. Longitudinal studies of local adaption to RETs over time is also requested.

Reactions to and attitudes towards local RET projects will always mirror the perceived/predicted stakes in the projects amongst the diversity of people and groups effected by the projects, and so perhaps some level of social and political contention linked to RETs should be expected. While we already have a raft of renewable energy technologies at our disposal, and new ones are rapidly emerging, the question is how we, as RET project stakeholders, as people, as communities and as societies embrace these technological futures. Crucially, however, as recognized in the multiple international initiatives combating the adverse effects of climate change, transitions to renewable energy resources do not just concern local communities; ultimately the cumulated successes or failures of regional, national and international transitions to sustainable energy resources have global and future impact; these changes concern future generations too (Rowson, 2013).

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